From:	Jeff.Keiser@CH2M.com
To:	Saric, James
Cc:	Patricia.White@CH2M.com; Frank.Dillon@CH2M.com
Subject:	Area 1 FS Draft Comments
Date:	Monday, October 28, 2013 2:08:34 PM
Attachments:	Predraft_Area_1_FS_comments_CH2MHILL10-27-2013Draft_FSD_PW_JK.docx

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Jim,

Please take a look at our revised comments. I provided the draft in native format in-case you have comments to add. Once I hear from you I will finalize these and submit them officially. I have not numbered the comments yet, it is easier to do as the last task. If you have additional comments to add feel free to let me know and I will add them to the list.

Call me with questions.

Thanks JK

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GENERAL COMMENTS

Overall

Commenting Organization: EPA **Commenter: Saric**
General Comment #:

The FS needs to reflect that the original FS was submitted to EPA with the ASTM and that this version has been rewritten. The entire ASTM will not be resubmitted as an attachment as it was in the original document, but portions have been reformatted and incorporated into this FS to support the discussion of the remedies. Sections of the ASTM that were directly incorporated into this document (i.e. Appendix G) were not revised based on EPA comments. These comments and changes must be addressed in this document.

Risk Assessment

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Commenting Organization: EPA **Commenter: Saric**
General Comment #:

The report can do a much better job summarizing the TBERA. There were comments that were made by EPA that were not included in the corresponding attachments and the conclusions and uncertainty discussion provided is not consistent. See the specific comments provided below for additional detail.

Commenting Organization: CH2M HILL **Commenter: Dillon**
General Comment #:

EPA has worked with GP to develop balanced language regarding the uncertainties associated with the risk estimates presented in the TBERA. This was extended to the language in ASTM. Further concerns were raised about the language in the Arcadis FS concerning the description of risk. EPA had provided comments. The summary of the TBERA does not adequately present a balanced interpretation of the results or address concerns raised by EPA to GP in the ASTM and Arcadis FS. Please review comments on the Arcadis FS concerning the presentation of ecological risk.

Alternatively GP could consider replacing Section 1.3.3.3 with the following text taken from the ASTM.

"An updated Area 1 TBERA for terrestrial birds and mammals is included as Appendix B to the USEPA-approved Area 1 SRI Report (ARCADIS 2012). The Area 1 TBERA did not revisit the aquatic portion of the Site-Wide Baseline Ecological Risk Assessment (BERA) conducted by CDM on behalf of MDEQ (CDM 2003a), but rather carried forward the BERA conclusions relative to aquatic receptors. The aquatic receptors most at risk (i.e., mink) are primarily exposed via the consumption of PCB-containing fish, so to address risks to aquatic-feeding receptors; the focus of remedy planning for sediments is to reduce PCB concentrations in fish.

The development of the Area 1 TBERA was a coordinated effort among Georgia-Pacific, USEPA, the State of Michigan, and the U.S. Fish and Wildlife Service (USFWS). The participants agreed on key inputs and elements of the assessment, including establishing the focus of the Area 1 TBERA on the terrestrial environment, receptors, and pathways within the former Plainwell Impoundment and the Plainwell No. 2 Dam Area. These two areas were the focus of recent TCRAs completed to address PCBs; therefore, the participants agreed to have the update focus on the assessment of residual risks to terrestrial receptors associated with PCB exposure via the food chain in the former Plainwell Impoundment and the Plainwell No. 2 Dam Area. Representative receptors were selected as the most highly-exposed species likely to inhabit Area 1. The participants also agreed that the Area 1 TBERA would use the inputs to the CDM Site-Wide BERA (CDM 2003a) as a point of departure.

The Area 1 TBERA found no unacceptable risk to either carnivorous birds and mammals or mid-range sensitivity birds. Possible risk was identified for vermivorous mammals in localized areas. Possible, but inconclusive, risk was also identified for high-sensitivity insectivorous birds and vermivorous birds (i.e. birds with greater than 40% worms in diet), if present."

Based on the results of the TBERA and the acknowledged uncertainty in the risk estimates, reduction of unacceptable risks to ecological receptors was considered in this FS.

Note the last sentence was added by EPA.

RAOs/PRGs

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Commenting Organization: EPA **Commenter: Saric**
General Comment #:

RAO 1: Revisions to RAO 1 provided to Georgia Pacific on April 25, 2013 have not been incorporated into the FS (e-mail communication from Jim Saric/EPA to Chase Fortenberry/GP, *Area 1 FS RAO 1*). The agreed upon text, provided below, should be incorporated in to the document.

Protect people who consume Kalamazoo River fish taken from Area 1 from exposure to PCBs that exceed protective levels. The RAO is expected to be progressively achieved over time by meeting the following targets for fish tissue and sediment:

- *Reduction in the Michigan fish advisory level for smallmouth bass to two meals per month (0.11 mg/kg) total PCB concentration in fish tissue within 30 years*
- *Achievement of a non-cancer HI of 1.0 and a 10^{-5} cancer risk within 30 years for the high-end sport angler (100 percent bass diet)*
- *The fish tissue goal for bass will be achieved by reducing sediment PCB SWAC in each of eight segments of the river in Area 1 to 0.33 ppm or less as soon as possible following completion of the remedial action*

Commenting Organization: EPA **Commenter: Saric**
General Comment #:

The fish PRG used in the FS is inconsistent with RAO 1 (0.11 mg/kg vs. 0.2 mg/kg). In addition, Appendix I uses a "concentration to achieve" of (0.23 mg/kg) which is inconsistent with RAO 1 and the rest of the FS. The Fish PRG should be 0.11mg/kg, which is consistent with the high end sport angler 100% SMB diet. The fish trends will need to be revised to reflect the time period to achieve the (0.11 mg/kg).

Commenting Organization: EPA **Commenter: Saric**
General Comment #:

The Flood plain PRG of 11 ppm should include protectiveness statements for avian species, as it was not solely derived based upon shrews.

The RBC of 11 mg/kg PCBs is also assumed to be protective of avian receptors as it represents a balance between risk and uncertainty surrounding the various methodologies and assumptions for calculating risk to avian receptors employed in the TBERA.

This language should be included in the FS along with a reference to Appendix G.

Additional discussion on why the RAL of 20 mg/kg was selected for the floodplains, as well as the percentage of home ranges protected or not protected is required. This information needs to be included in Chapter 2.

Commenting Organization: EPA **Commenter: Saric**
General Comment #:

The sediment PRG does not provide sufficient rationale for its selection. The discussion should include the use of the MDEQ detection limit, as that was also part of the reasoning behind the selection of (0.33 mg/kg).

Background

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Commenting Organization: EPA **Commenter: Saric**
General Comment #:

Background discussions and comparisons with data from both the Ceresco Dam impoundment (ABSA 1) and the Morrow Dam impoundment (ABSA 2) need to be included. As discussed in comments to the previous version of the FS, EPA does not consider Morrow ~~Lake~~ Dam impoundment a "better" background location. Despite ongoing discussions regarding the use of Marrow Lake and Ceresco Dam data, it is not appropriate to exclude the Ceresco data. Comparisons from both water bodies are necessary in each section of the document where background is discussed.

Fish Tissue Trend Analysis

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Commenting Organization: EPA **Commenter: Saric**

General Comment #:

The Fish trend discussion; Chapter 4, table 4-1 and Appendix I, do not break fish trends down by individual sediment alternative. EPA requested this trend approach in previous FS and comments and our recent discussions. The current FS does not support the conclusions that there are no differences in fish tissue reduction rates between sediment remedies 3 and 4, since this information wasn't provided.

Commenting Organization: CH2M HILL **Commenter: Dillon**
General Comment #:

The use of projected declines in fish tissue PCB concentrations is an important component for the evaluation of remedies. However, the fish tissue trend analysis presented in the FS is technically weak and based in part on unsubstantiated assumptions. As currently presented the trend analysis does a poor job in differentiating remedies. The FS must be revised to incorporate post remedial estimates of tissue trends based on a more technically rigorous analysis such, as BSAFs and/or a regression approach, to better inform the remedy selection process.

Commenting Organization: CH2M HILL **Commenter: White**
General Comment #:

For alternatives S-3A, S-3B, S-4A and S-4B, it is assumed that the fish tissue rate of decline would be 2% during remedial design, 0% during construction, and 3% after construction is completed. However, alternatives 4A/4B include removal of additional sediment along the edges of the channel in Section 3, which will result in a lower SWAC. The fish tissue declines associated with alternatives 3A/3B and 4A/4B would therefore be expected to differ. The FS should be revised to provide a stronger technical basis for estimating the post-remediation fish tissue concentrations (e.g., through the use of a post-remediation SWAC and BSAF, and subsequent decline based on expected fish tissue trends).

Remedy Selection

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Commenting Organization: EPA **Commenter: Saric**
General Comment #:

Delete the scoring and ranking of each remedy as it should not be part of the FS. The ranking is too subjective and EPA does not concur with the scoring and ranking conclusions regarding preferred remedies in Chapters 4, 5, and 6.

Commenting Organization: EPA **Commenter: Saric**
General Comment #:

The mass removal discussion from the previous FS in relation to RAO 4 for the various sediment alternatives should be included in this FS. The overall remaining mass and potential mass removal from the remaining hot spots provides important information regarding the

uncertainty and risk in remedy selection. This is particularly important for the Sed 3 and Sed 4 remedies.

Commenting Organization: EPA **Commenter: Saric**
General Comment #:

The floodplain remedies need to include a discussion of residential sampling as identified in Chapter 3.

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Commenting Organization: CH2M HILL **Commenter: White**
General Comment #:

The proposed long term monitoring program is not likely to be sufficient to verify progress towards achieving the RAOs through MNR. Although the final components of the long term monitoring program will be defined as part of the ROD, a more comprehensive monitoring approach will be required to better understand the relationship between sediment and fish tissue concentrations and verify that MNR is proceeding as expected. At a minimum, add sediment sampling to the long term monitoring scope in the FS.

SPECIFIC COMMENTS

Commenting Organization: CH2M HILL **Commenter: White**
Section: Executive Summary **Page #: ES-1** **Lines #:**
Specific Comment #

Second paragraph – in the bulleted list of information included in the FS report, add a bullet for a summary of the Remedial Investigation results and conceptual site model.

Commenting Organization: CH2M HILL **Commenter: White**
Section: Executive Summary **Page #: ES-2** **Lines #:**
Specific Comment #

The summary of the nature and extent of sediment contamination should include a brief description of the distribution of PCBs in Area 1 in addition to the description of SWACs.

Commenting Organization: CH2M HILL **Commenter: White**
Section: Executive Summary **Page #: ES-12** **Lines #:**
Specific Comment #

Tables E-5 and E-6 should summarize the comparative analysis of the sediment and floodplain soils relative to the CERLCA evaluation criteria.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 1.3 **Page #: 1-5** **Lines #:**
Specific Comment #:

Recommend renaming this section "Area 1 SRI Summary and Conceptual Site Model." The descriptions of the previous source control actions and TCRAs (Section 1.3.4) should be renumbered as Section 1.4 because these actions were not part of the SRI.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 1.3.1 **Page #: 1-7** **Lines #:**
Specific Comment #:

This section should note that all sediment PCB data are reported as total Aroclors.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 1.3.1.1 **Page #: 1-8** **Lines #:**
Specific Comment #:

Sampling between Crown Vantage Landfill and Plainwell #2 Dam – text summarizing the scope and objectives of this sampling appears to be missing from the beginning of this paragraph.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 1.3.1.1 **Page #: 1-10** **Lines #:**
Specific Comment #:

SWAC and Confidence Interval Results – "The SWAC for Section 8 was developed using primarily pre-Plainwell Dam removal data and [are] not representative of actual PCB SWACs in that section." Please replace the word "actual" with "present-day" and clarify that samples representing areas that were excavated in the TCRA were removed from the data set prior to calculation of the SWAC. This comment also applies to the Executive Summary.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 1.3.1.2 **Page #: 1-11** **Lines #:**
Specific Comment #:

Please add a table summarizing the average PCB concentrations in floodplain soils in Soil Areas 1 through 4.

Commenting Organization: CH2M HILL **Commenter: Dillon**
Section: 1.3.1.3 **Page #: 1-13** **Lines #:**
Specific Comment #:

The fourth paragraph discusses the two approaches used in trend analysis, total Aroclors for fillets and total congeners for whole-body. Please explain the rational for using different measures even when both Aroclor and congener data where available.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 1.3.1.3 **Page #: 1-14** **Lines #:**
Specific Comment #:

The second paragraph describes the extents of the Urban reach and Dam reach used for fish tissue trend analysis. Please show the extent of these reaches on Figure 1-3.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 1.3.2 **Page #: 1-17** **Lines #:**
Specific Comment #:

Floodplains – " . . . mobilization of floodplain soil via erosion into the river is not expected to be a major transport mechanism." The potential mobilization of floodplain soil in other (downstream) areas of the river should be addressed using hydrodynamic model results. No change is requested for the Area 1 FS because a hydrodynamic model was not developed for Area 1.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 1.3.3.1 **Page #: 1-21** **Lines #:**
Specific Comment #:

Central Tendency Sport Anglers - "Carcinogenic risks in Area 1 were within USEPA's acceptable risk range . . . regardless of the EPC used or the fish consumption scenario evaluated." Tables 1-5 and 1-6 indicate that mixed diet risks are greater than 1×10^{-4} for both the 95%UCL and mean EPCs.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 1.3.3.1 **Page #: 1-23** **Lines #:**
Specific Comment #:

"Reproductive and immunological hazards in Area 1 were indicated by HQs greater than the target of 1 in ABSAs 4 and under both EPCs. . ." Revise to include ABSAs 4 and 5.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 1.3.3.1 **Page #: 1-26** **Lines #:**
Specific Comment #:

Risks and Hazards for Residents and Recreationists Exposed to Floodplain Soil – please include tables summarizing the risks and hazards for each floodplain soil area.

Commenting Organization: CH2M HILL **Commenter: Dillon**
Section: 1.3.3.3 **Page #: 1-28** **Lines #:2nd paragraph 3rd line**
Specific Comment #:

The text reads "For terrestrial species, vermivorous birds, represented by the American robin…."Later in this section the American robin is referred to as an omnivorous species. Please review the BERA and use consistent classifications for the various receptor groups.

Commenting Organization: CH2M HILL **Commenter: Dillon**
Section: 1.3.3.4 **Page #: 1-30** **Lines #: 2nd paragraph 1st line**
Specific Comment #:

Change "omnivorous birds (American robin and American woodcock)" to *vermivorous birds (American robin and American woodcock).*

Commenting Organization: CH2M HILL **Commenter: Dillon**
Section: 1.3.3.4 **Page #: 1-130** **Lines #: 2nd paragraph 13th line**
Specific Comment #:

The text refers to calculating mean EPCs for the wildlife home ranges based on unbiased and biased sediment data. For clarity these data should be referred to as floodplain soil data. Please change here and in subsequent paragraphs.

Commenting Organization: CH2M HILL **Commenter: Dillon**
Section: 1.3.3.4 **Page #: 1-30** **Lines #:3rd paragraph 10th line**
Specific Comment #:

The text notes high sensitivity and midrange sensitivity toxicity reference values. It should be clarified what is meant by these terms. Please consult section 5.2 of the TBERA.

Commenting Organization: CH2M HILL **Commenter: Dillon**
Section: 1.3.3.4 **Page #: 1-30** **Lines #: 3rd paragraph**
Specific Comment #:

Delete the last two sentences or add more detailed text as presented in the TBERA and ASTM to give a more balanced presentation on the potential site species that might be considered "sensitive."

Commenting Organization: CH2M HILL **Commenter: Dillon**
Section: 1.3.3.4 **Page #: 1-30** **Lines #: last paragraph 1st sentence**
Specific Comment #:

Please describe high, moderate and low sensitivity.

The recent publication by Manning et.al. 2013, post TBERA, indicates that the relative sensitivity of avian receptors to the effects of dioxins/furans and dioxin like PCB congeners is more complex than the simple classification system of high, moderate and low sensitivity. The results of the current research suggest that these is no simple ratio of species sensitivity between the groups based on AhR structure and that the relative sensitivity is also affected by the mix of congeners, which suggest that sensitivity is partially site-specific.

EPA acknowledges that there continues to be uncertainly around this issue as the science develops further. However, EPA believes that this uncertainty needs to be clearly addressed when characterizing and discussing risk to avian receptors at the site. If the TBERA summary includes expanded discussion of avian species based on sensitivity group and potential presence at the site then a discussion of Manning et.al. 2013 must be included.

G E. Manning, L. J. Mundy, D. Crump, S. P. Jones, S. Chiu, J. Klein, A. Konstantinov, D. Potter, and S. W. Kennedy. 2013. Cytochrome P4501A induction in avian hepatocyte cultures exposed

to polychlorinated biphenyls: Comparisons with AHR1-mediated reporter gene activity and *in ovo* toxicity. Toxicology and Applied Pharmacology 266 (2013) 38–47

~~**Commenting Organization: CH2M HILL** **Commenter: Dillon**~~
~~**Section: 1.3.3.4** **Page #: 1-30 and 31** **Lines #:**~~
~~**Specific Comment #:**~~
~~It is unclear why the last paragraph on 1-30 and the first on 1-31 are preceded with a bullet notation.~~

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Commenting Organization: CH2M HILL **Commenter: White**
Section: 1.3.4.3 **Page #: 1-39** **Lines #:**
Specific Comment #:

TCRA Effectiveness – ". . . PCB concentrations in fish tissue were reduced by one order of magnitude . . ." Please identify the type(s) of fish that showed this reduction.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 1.4 **Page #: 1-41** **Lines #:**
Specific Comment #

Media of Concern – this section should be revised to indicate that the media of concern are sediments, fish, and floodplain soils. Hot spots in Sections 2 and 4, the Crown Vantage side channel, and sediments in Section 3 are remediation target areas for some of the remedial alternatives. This comment also applies to the Executive Summary.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 2.2 **Page #: 2-1** **Lines #:**
Specific Comment #:

For completeness, the RAO section should document the approach for addressing all media and pathways that were identified as posing potentially unacceptable risks in the human health and ecological risk assessments. Section 2.2 should explain why there is no RAO related to residents and recreationists exposed to floodplain soil.

~~**Commenting Organization: CH2M HILL** **Commenter: Dillon**~~
~~**Section: 2.4.** **Page #: 2-9** **Lines #: 1st sentence**~~
~~**Specific Comment #:**~~
~~Please define RBC.~~

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Commenting Organization: CH2M HILL **Commenter: Dillon**
Section: 2.4. **Page #: 2-9** **Lines #:**
Specific Comment #:

The paragraph presents the general basis for the RBCs for human receptors but does not include a similar discussion for ecological receptors. Please add a brief description indicating that RBCs for ecological receptors represented a risk range (i.e., NOAEL and LOAEL) for each receptor group.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 2.4.1 **Page #: 2-9** **Lines #:**
Specific Comment #:

Appendix B of the BHHRA should be provided as an appendix to the FS because it provides key supporting information for the development of risk-based concentrations for fish.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 2.4.2 **Page #: 2-10** **Lines #:**
Specific Comment #:

The second paragraph notes that ABSA-02 is physically separated by the Morrow ~~Lake~~ Dam impoundment from Area 1. Please expand this discussion to assess the degree to which the fish populations are physically separated from each other. The last sentence in the third paragraph states that PRGs for Area 1 should not be set lower than concentrations in Morrow ~~Lake~~Dam impoundment because it is directly upstream. However, it is possible that fish tissue concentrations in Area 1 could decline below concentrations in Morrow ~~Lake~~ Dam impoundment because of the differences in habitat and the physical barrier between the two areas.

Commenting Organization: CH2M HILL **Commenter: Dillon**
Section: 2.4.2 **Page #: 2-10** **Lines #: last paragraph 1st sentence**
Specific Comment #:

The conclusion is drawn that fish sample site ABSA-02 is the most representative for use as background. The text does not provide adequate justification for that conclusion. Please expand the discussion supporting the conclusion or drop ABSA-02 as the preferred background location.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 2.4.2.1 **Page #: 2-11** **Lines #:**
Specific Comment #:

Third paragraph – "Generally, smallmouth bass fillet tissue PCB concentrations declined in ABSA-01, but increased slightly in ABSA-02." Please indicate whether these trends are statistically significant.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 2.4.2.2 **Page #: 2-11** **Lines #:**
Specific Comment #:

RBCs for fish tissue – "Based on protection of high end sport anglers . . . a risk-based concentration of (RBC_{fish}) of 0.2 mg/kg (non-lipid corrected) was previously calculated . . . " Table 2-4 indicates that the RBC_{fish} values for the high end sport angler are 0.042 and 0.072 mg/kg.

Commenting Organization: CH2M HILL **Commenter: Dillon**

Section: 2.4.2.4 **Page #: 2-11** **Lines #: 1st sentence**
Specific Comment #:

The text states that lipid normalization was done using the mean percent lipid for fish tissue in each reference ABSA. The lipid normalization should be done with the actual lipid concentration from each fish sampled. Please clarify.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 2.4.2.2 **Page #: 2-11 and 2-12** **Lines #:**
Specific Comment #:

Table 2-5 – please add the RBCs for fish (similar to the format of Table 2-6, which shows lipid-corrected RBCs for fish). On Table 2-6, the footnote related to a lipid-corrected RBC of 0.2 mg/kg is confusing. Is this meant to say "non-lipid corrected"? Additionally, as previously noted, the 0.2 mg/kg tissue value does not correspond to the high end sport angler.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 2.4.2.3 **Page #: 2-11** **Lines #:**
Specific Comment #:

The second paragraph in this section also states that the RBC_{fish} for the high end sport angler is 0.2 mg/kg, which is the same as the fish tissue concentrations in ABSA-02. As noted above, the RBC_{fish} of 0.2 mg/kg corresponds to the upper end of the range for the central tendency sport angler.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 2.4.3 **Page #: 2-12** **Lines #:**
Specific Comment #:

Selection of fish tissue preliminary remediation goals – please add a figure similar Figure 2-1 for sediment that shows individual RBC_{fish} values for specific risk and hazard levels, concentration ranges for the various fish advisory levels, and ABSA-01 and ABSA-02 reference area concentrations. The fish advisory range for one meal per month is 0.21 to 1.0 mg/kg, not 0.11 to 0.21 mg/kg as cited in the text.

Commenting Organization: CH2M HILL **Commenter: Dillon**
Section: 2.4.4 **Page #: 2-12** **Lines #:**
Specific Comment #:

The text discussing BSAFs indicates that %lipid and %TOC are used but then reports those parameters in their fractional equivalent. Please edit the section to use consistent terminology.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 2.4.4 **Page #: 2-14** **Lines #:**
Specific Comment #:

Figure 2-1 – this figure should show the point concentrations for each type of angler and effect (i.e., should show the RBCs for risk and hazard for each angler separately instead of as a range).

Also add the mean and 95%UPL for reference to this figure. Showing the full range of RBCs and background concentrations will provide a more complete picture to support selection of the sediment PRG.

Commenting Organization: CH2M HILL **Commenter: Dillon**
Section: 2.4.6 **Page #: 2-15** **Lines #: 1st paragraph 1st sentence**
Specific Comment #:

Change the sentence to read, *"The site-wide, risk based floodplain soil concentrations (RBC_{soil}) for the protection of human receptors were derived in……."*

Commenting Organization: CH2M HILL **Commenter: Dillon**
Section: 2.4.6 **Page #: 2-15** **Lines #: last paragraph**
Specific Comment #:

Delete this paragraph it is redundant with summaries of the TBERA presented earlier in the document. Replace with the following: *"The Area 1 TBERA (ARCADIS 2012d) presented a range of soil RBCs for terrestrial receptors. Table 2-10 presents a summary of the potential RBC_{soil} for ecological receptors."*

~~**Commenting Organization: CH2M HILL** **Commenter: Dillon**~~
~~**Section: Table 2-10** **Page #: 2-16** **Lines #:**~~
~~**Specific Comment #:**~~

~~The citation is incorrect. It should be (ARCADIS 2012d).~~

~~Change the heading from "Exposed Sediment/Floodplain RBCsoil (mg/kg)" to *RBC for Floodplain Soil in mg/kg total PCBs*.~~

Commenting Organization: CH2M HILL **Commenter: Dillon**
Section: 2.4.7 **Page #: 2-16** **Lines #: 1st line of section**
Specific Comment #:

Change "terrestrial mammals" to *maximally exposed wildlife.*

Commenting Organization: CH2M HILL **Commenter: Dillon**
Section: 2.4.7 **Page #: 2-17** **Lines #: 2nd to last sentence**
Specific Comment #:

The text reads: "this PRG is between the geometric mean and arithmetic mean of the range of RBC_{soil} determined for the short-tailed shrew." Change the text to read as follows, *"This PRG is the geometric mean of the no observable adverse effect level (NOAEL) and lowest observable adverse effects level (LOAEL) and is considered a reasonably conservative estimate of the potential toxicity threshold that would be protective of maximally exposed wildlife species. Based on the analysis in the ASTM, this RBC is shown to be protective of 94% of the home ranges for maximally exposed mammalian receptors such as the shrew. The RBC of 11 mg/kg PCBs is also assumed to be protective of avian receptors as it represents a balance between risk and uncertainty surrounding the various methodologies and assumptions for calculating risk to avian receptors employed in the TBERA."*

Commenting Organization: CH2M HILL **Commenter: White**
Section: 3.1.1 **Page #: 3-2** **Lines #:**
Specific Comment #:

The sediment technology screening does not consider in situ treatment (e.g., addition of an activated carbon amendment to the sediment) because the effectiveness of the technology had not been demonstrated at the time the technology screen was first performed. Sediment amendments have since been tested and shown to be effective at a number of sites. The technology screen should be updated to reference in situ treatment, perhaps in conjunction with the evaluation of thin layer capping.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 3.2.1 **Page #: 3-7** **Lines #:**
Specific Comment #:

"The sediment PRG of 0.33 mg/kg for PCBs would be met by reducing the SWAC from 1 or less to 0.33 mg/kg . . . " Should this be " . . . from 1 or more . . ."?

Commenting Organization: CH2M HILL **Commenter: White**
Section: 4.2.1 **Page #: 4-2** **Lines #:**
Specific Comment #:

The proposed long term monitoring program ~~may~~ is not likely to be sufficient to verify progress towards achieving the RAOs through MNR~~; however, as noted in the text,~~ Although the final components of the long term monitoring program will be defined as part of the ROD, a more comprehensive monitoring approach will be required to better understand the relationship between sediment and fish tissue concentrations and verify that MNR is proceeding as expected. At a minimum, add sediment sampling to the long term monitoring scope in the FS. ~~.~~

Commenting Organization: CH2M HILL **Commenter: White**
Section: 4.2.2.1 **Page #: 4-3** **Lines #:**
Specific Comment #:

The first paragraph states that current rates of fish tissue declines range from 0% to 7.7% per year, and these rates are applied to all types of fish in Appendix I to estimate a range of recovery times. However, the species-specific rates should be used for each species (i.e., 0% to 4.5% for smallmouth bass).

Commenting Organization: CH2M HILL **Commenter: White**
Section: 4.2.2.1 **Page #: 4-3** **Lines #:**
Specific Comment #:

First paragraph – "These rates represent a variety of conditions . . . and include, but are not limited to . . . natural recovery." Delete the phrase "natural recovery" because all of the processes in the preceding list are natural recovery processes.

Commenting Organization: CH2M HILL **Commenter: White**

Section: 4.2.2.1 **Page #: 4-3** **Lines #:**
Specific Comment #:

The time to achieve RAOs will need to be updated based on the revised fish tissue PRGs.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 4.2.2.1 **Page #: 4-3** **Lines #:**
Specific Comment #:

Table 4-1 – footnote c indicates that the "concentration to achieve" value for fish tissue corresponds to the high end sport angler RBC presented in Figure 2-1. Figure 2-1 presents sediment RBCs, not fish tissue RBCs.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 4.2.2.1 **Page #: 4-3** **Lines #:**
Specific Comment #:

Fifth paragraph - "Time to reach overall sediment goals in Area 1 will therefore be faster than the overall fish tissue recovery periods listed in above . . . ~~"" Is "overall sediment goal" in this context referring to an Area-wide SWAC?~~ The RAO 1 language provided by EPA in April 2013 indicated that the sediment target would be applied to each of the eight segments of the river, so the time to achieve the sediment goal will be limited by the section that is slowest to recover. Revise the text to indicate that achievement of the sediment goal will be verified through long term monitoring.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 4.2.2.1 **Page #: 4-4** **Lines #:**
Specific Comment #:

"Therefore, bank erosion in Area 1 is not significantly contributing to downstream PCB transport." This conclusion is based on a single visual inspection survey performed in June 2013, which is not sufficient information to support this conclusion. The report should acknowledge that bank erosion in unremediated areas will be an ongoing source of PCB loading to the river channel and to fish. The text indicates that monitoring would include the restored banks in the TCRA area and unremediated PCB deposits in Sections 2, 3, and 4 and the Crown Vantage side channel. The riverbanks in unremediated areas should also be included in the monitoring program.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 4.2.2.2 **Page #: 4-4** **Lines #:**
Specific Comment #:

Second paragraph – "Time to achieve overall sediment goals (chemical-specific ARARs) in Area 1 is expected to be faster than the overall fish tissue recovery periods . . ." The sediment and tissue goals are not chemical-specific ARARs because they are not promulgated cleanup standards. This comment applies to the assessment of compliance with ARARs for all alternatives, and to Table 4-9.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 4.2.2.3 **Page #: 4-4** **Lines #:**
Specific Comment #:

Long-term effectiveness – the second paragraph discusses the potential for sediment erosion to expose more highly contaminated subsurface sediments. In the absence of a hydrodynamic model for Area 1, the potential for high flows to exposure subsurface contamination cannot be reliably assessed. A hydrodynamic model should be used for the downriver areas of the river to address this question with greater confidence. The text in this section should be revised to clarify that there is a risk of exposing subsurface contamination, but ~~that even~~ if exposed, natural recovery processes would be expected to mitigate the effects of that contamination over time.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 4.3.2.3 **Page #: 4-8** **Lines #:**
Specific Comment #:

Long-term effectiveness – This section should note that the removal of buried PCB-containing sediment addresses RAO 4 (whereas MNR alone does not).

Commenting Organization: CH2M HILL **Commenter: Andrae**
Section: 4.4.1 **Page #: 4-9** **Lines #:**
Specific Comment #:

Is the water depth sufficient to accommodate the 12-inch sand cap and 6-inch gravel layer (18-inch total)?

Commenting Organization: CH2M HILL **Commenter: Andrae**
Section: 4.5.1 **Page #: 4-10** **Lines #:**
Specific Comment #:

Is the primary purpose of the sand cap to prevent resuspension of the residuals or to dilute the concentration of the PCBs to meet a SWAC?

Commenting Organization: CH2M HILL **Commenter: White**
Section: 4.5.2 .1 and 4.5.2.3 **Page #: 4-11** **Lines #:**
Specific Comment #:

Overall protection of human health and the environment for alternative 4A (*and 4B) is considered to be similar to S-3A (and 3B), with the same fish tissue trends. However, the SWAC in Section 3 would be reduced to a greater degree for Alternative 4A, which ~~may~~ is expected to result in greater fish tissue reductions. The technical basis for predicting post-remediation fish tissue concentrations should be strengthened; for example, by using a post-remediation SWAC and BSAF, and expected fish tissue trends for subsequent declines. Additionally, the text should be revised to indicate that for Alternatives 4A (and 4B), less contaminated sediment would be available for downstream transport, which addresses RAO 4 to a greater degree than SA-3A (and-3B).

Commenting Organization: CH2M HILL **Commenter: White**
Section: 4.7.2.1 **Page #: 4-15** **Lines #:**
Specific Comment #:

A 10% step down concentration is assumed based on reductions seen after the Bryant Mill Pond TCRA. ~~Report the fish species that experienced this level of reduction.~~ The Bryant Mill Pond example may not be sufficiently comparable to the main channel of the river to expect similar results. As noted in previous comments, an alternative approach should be used to predict post-remediation fish tissue concentrations.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 4.8 **Page #: 4-17** **Lines #:**
Specific Comment #:

In the comparative analysis, alternatives should not be quantitatively scored and ranked. The analysis should use symbols similar to what was used in the Draft Area 1 FS Report.

Commenting Organization: CH2M HILL **Commenter: Andrae**
Section: 4.8 and 5.6 and Tables: 4-9 and 5-5
Specific Comment #:

Please remove scoring and ranking columns from table and text.

Commenting Organization: CH2M HILL **Commenter: Andrae**
Section: 5.2.1 **Page #: 5-2** **Lines #:**
Specific Comment #:

Do the ECs include repairing erosion discovered during the inspections or just the inspections?

Commenting Organization: CH2M HILL **Commenter: Andrae**
Section: Appendix H – S-3A **Page #:H-2** **Lines #:**
Specific Comment #:

Water treatment should also consider the addition of coagulation/flocculation and clarification or filtration. It is highly unlikely that the bag filters and carbon filters will remove clays and colloids.

EDITORIAL COMMENTS

Commenting Organization: CH2M HILL **Commenter: White**
Section: 1.2.3 **Page #: 1-3** **Lines #:**
Specific Comment #:

River sections are first mentioned in the second paragraph of this section, but the river sections are not defined until page 1-6. Consider moving the bulleted list defining the Area 1 river sections to the beginning of Section 1.2.3~~—~~.

Commenting Organization: CH2M HILL **Commenter: Dillon**
Section: 1.3.1 .1 **Page #: 1-9** **Lines #:19**
Specific Comment #:

The abbreviation SWAC is used for the first time here. It should be defined.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 1.3.1.3 **Page #: 1-14** **Lines #:**
Specific Comment #:

Second paragraph – please cite a map showing the specific ABSA sampling locations (e.g., ABSA-03.5).

Commenting Organization: CH2M HILL **Commenter: Dillon**
Section: 1.3.3.4 **Page #: 1-30 and 31** **Lines #:**
Specific Comment #:

It is unclear why the last paragraph on 1-30 and the first on 1-31 are preceded with a bullet notation.

Commenting Organization: CH2M HILL **Commenter: Dillon**
Section: 2.4. **Page #: 2-9** **Lines #: 1st sentence**
Specific Comment #:

Please define RBC.

Commenting Organization: CH2M HILL **Commenter: Dillon**
Section: Table 2-10 **Page #: 2-16** **Lines #:**
Specific Comment #:

The citation is incorrect. It should be (ARCADIS 2012d).

Change the heading from "Exposed Sediment/Floodplain RBCsoil (mg/kg)"to *RBC for Floodplain Soil in mg/kg total PCBs.*

Commenting Organization: CH2M HILL **Commenter: White**
Section: Figure 3-3 **Page #:** **Lines #:**
Specific Comment #:

Please add a label identifying hot spot S-IM1 in the inset upstream of the Crown Vantage landfill.

Commenting Organization: CH2M HILL **Commenter: White**
Section: 4.3.2.1 **Page #: 4-6** **Lines #:**
Specific Comment #:

Third paragraph - reference to Table 4-2 should be Table 4-3.